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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1 1. (currently amended) A method of watermarking a video signal to including
2 include additional information therein, the method comprising the step of impressing said
3 video signal being characterized in that at least a portion of said additional information
4 has been impressed upon a chrominance portion of said video signal by placing it in at
5 least one selected bit position of a value derived from an average of said chrominance
6 portion over a block of said video signal.

1 2. (original) The invention as defined in claim 1 wherein said portion of said
2 additional information is a bit.

1 3. (original) The invention as defined in claim 1 wherein said additional
2 information replaces at least one bit of said value derived from said average of said
3 chrominance portion over said block.

1 4. (original) The invention as defined in claim 1 wherein said value derived from
2 an average of said chrominance portion over a block of said video signal is the average of
3 the values of said chrominance portion for each pixel of said block.

1 5. (original) The invention as defined in claim 1 wherein said additional
2 information is not substantially perceivable by the human visual system when said video
3 signal including said additional information is displayed on a display device.

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1 6. (original) The invention as defined in claim 1 wherein said additional
2 information was impressed by changing the value of said chrominance portion of various
3 pixels of said block, and wherein the magnitude of the change in value any pixel is a
4 function of the amount of change that can be introduced into said pixel without resulting
5 in an artifact that is substantially detectable by the human visual system.

1 7. (original) The invention as defined in claim 1 wherein said additional
2 information was impressed by changing the value of said chrominance portion of various
3 pixels of said block, and wherein the magnitude of the change in value any pixel does not
4 exceed the amount of change that can be introduced into said pixel without resulting in an
5 artifact that is substantially detectable by the human visual system.

1 8. (original) The invention as defined in claim 1 wherein the position of said
2 selected bit is fixed for at least one block of at least one frame of said video signal.

1 9. (original) The invention as defined in claim 1 wherein the position of said
2 selected bit is dynamically determined for at least one block of at least one frame of said
3 video signal.

1 10. (original) The invention as defined in claim 1 wherein the position of said
2 selected bit is determined based on a texture variance of said block.

1 11. (original) The invention as defined in claim 1 wherein said bit position into
2 which said additional information is impressed is a bit of the integer portion of said value
3 derived from said average.

1 12. (original) The invention as defined in claim 1 wherein said block of said
2 video signal is in a reduced resolution format such that for each 2x2 luminance block of
3 an original version of said video signal, had said original version of said video signal
4 been in 4-4-4 representation, there remains only one Y, one U, and one V value.

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1 13. (original) The invention as defined in claim 1 wherein said average of said
2 chrominance portion over said block of said video signal is a DC coefficient of said block
3 in a frequency domain representation of said block of said video signal.

1 14. (original) The invention as defined in claim 1 wherein said additional
2 information was placed in said at least one selected bit position in a manner that makes a
3 minimum change to said average.

1 15. (original) The invention as defined in claim 1 wherein said additional
2 information was placed in said at least one selected bit position by adding a value to said
3 average so as to make the value of said at least one bit position of said value derived from
4 said average the same as said additional information to be impressed.

1 16. (original) The invention as defined in claim 1 wherein said additional
2 information was placed in said at least one selected bit position by adding a value to said
3 average so as to make said at least one bit position the same in said value derived from
4 said average as said additional information to be impressed while making only a
5 minimum change to the value of said average when impressing said data.

1 17. (original) The invention as defined in claim 1 wherein said additional
2 information was placed in said at least one selected bit position by adding a value to said
3 average so as to make said at least one bit position of said value derived from said
4 average the same in value as said additional information to be impressed, said adding to
5 said average having been achieved by adding an amount to the said chrominance portion
6 of various pixels of said block, said additions to said pixel chrominance portions being
7 made until a total of such additions equals the product of said value and the number of
8 pixels in a block, said additions being independent of any other changes made to the
9 chrominance portion of said pixels.

1 18. (original) The invention as defined in claim 1 wherein said video signal
2 further comprises a margin signal added thereto to reduce the likelihood that said
3 additional information will be eliminated should said video signal undergo quantization.

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1 19. (original) The invention as defined in claim 1 wherein said video signal
2 further comprises a margin signal added thereto to reduce the likelihood that said
3 additional information will be eliminated should said video signal undergo motion picture
4 experts group (MPEG)-type encoding.

1 20. (original) The invention as defined in claim 1 wherein said additional
2 information was placed in said at least one selected bit position by adding only a
3 minimum necessary amount to said average so that in said value derived from said
4 average said at least one bit position is made to have the same value as said additional
5 information to be impressed and said value derived from said average is within a safe
6 range.

1 21. (original) The invention as defined in claim 1 wherein said additional
2 information is interleaved within said video signal with respect to its ordering prior to
3 undergoing a process to be impressed therein.

1 22. (original) The invention as defined in claim 1 wherein said additional
2 information is channel encoded within said video signal.

1 23. (original) Apparatus for embedding additional watermarking data within a
2 video signal, comprising:

3 a color selection unit for selecting a chrominance portion of a block of said video
4 signal to carry a portion of said additional watermarking data; and

5 a data adder that adds information to pixels of said block of said video signal
6 thereby causing a change in the average value of said selected chrominance portion so as
7 to incorporate at least a portion of said additional watermarking data within said changed
8 average value.

1 24. (original) The invention as defined in claim 23 wherein said color selection
2 unit comprises a prestored table in computer readable form that indicates for each area
3 within at least a colorspace portion which chrominance portion should be selected for
4 pixels within said each area.

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1 25. (original) The invention as defined in claim 23 further comprising a block
2 interleaver that interleaves said additional watermarking data prior to said additional
3 watermarking data being incorporated within said changed average value.

1 26. (original) The invention as defined in claim 23 further comprising a channel
2 encoder that channel encodes said additional watermarking data prior to said additional
3 watermarking data being incorporated within said changed average value.

1 27. (original) The invention as defined in claim 23 wherein said data adder
2 modifies only a said selected chrominance portion of said pixels and further comprising a
3 multiplexer for multiplexing at least the unmodified chrominance portion of said pixels
4 and said modified chrominance portion of said pixels.

1 28. (original) The invention as defined in claim 23 wherein said data adder
2 further comprises a bit mapper.

1 29. (original) The invention as defined in claim 23 wherein said data adder
2 further comprises a texture masking unit that determines a amount of change in said
3 chrominance portion that a pixel can endure while minimizing the likelihood of a visible
4 artifact resulting, and wherein said data adder adds no more than said amount to said
5 pixel.

1 30. (original) The invention as defined in claim 23 wherein said data adder adds a
2 further value to pixels of said block of said video signal thereby causing the resulting new
3 average value to be within a safe range..

1 31. (original) The invention as defined in claim 23 wherein said data adder
2 changes said average value by the least amount necessary to carry said additional
3 watermark data.

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1 32. (original) The invention as defined in claim 23 wherein said data adder adds a
2 further value to pixels of said block of said video signal thereby causing the resulting new
3 average value to be within a safe range and wherein said data adder further adds to pixels
4 of said block the value that changes said average value by the least amount possible.

1 33. (original) The invention as defined in claim 23 wherein said video signal has
2 the same resolution before and format after being watermarked by said video signal, but
3 wherein said apparatus operates in a reduced resolution format such that for each 2x2
4 luminance block of an of said video signal before watermarking, had said video signal
5 before watermarking been in 4-4-4 representation, there remains only one Y, one U, and
6 one V value in said reduced resolution format of said video signal.

1 34. (original) Apparatus for embedding additional watermarking data within a
2 video signal, comprising:

3 means for selecting a chrominance portion of a block of said video signal to carry
4 a portion of said additional watermarking data;

5 means for causing a change in the average value of said selected chrominance
6 portion so as to incorporate at least a portion of said additional watermarking data within
7 said changed average value.

1 35. (original) The invention as defined in claim 34 wherein said means for
2 causing a change changes said average value by placing in a selected bit position thereof
3 at least a portion of said additional information.

1 36. (original) The invention as defined in claim 34 wherein said means for
2 causing a change changes said average value by placing in a selected bit position thereof
3 at least a portion of said additional information and further changes said average value so
4 it is within a safe range.

1 37. (original) The invention as defined in claim 34 wherein said means for
2 causing a change effectuates said change in said average value by changing the values of
3 said selected chrominance portion of one or more of the pixels of said block.

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1 38. (original) A method for use in extracting watermark data from a watermarked
2 video signal, wherein said watermark data is carried in at least one bit position of an
3 average of the values of a chrominance portion of the pixels of at least one block of at
4 least one frame, the method comprising the step of:

5 selecting a chrominance portion that is likely to be carrying said watermark data in
6 said average of said values of said chrominance portion for said block;

7 extracting said watermark data from said average of said values of said selected
8 chrominance portion.

1 39. (original) The invention as defined in claim 38 further comprising the step of
2 determining which bit position of said average of said values is carrying said watermark
3 data, and wherein said extracting step extracts the value of said bit position.

1 40. (original) The invention as defined in claim 38 further comprising the step of
2 determining which bit position of said average of said values is carrying said watermark
3 data as a function of a busyness of said block, and wherein said extracting step extracts
4 the value of said bit position.

1 41. (original) The invention as defined in claim 38 wherein said determining step
2 further comprises the steps of:

3 making a determination for each pixel in said block as to which chrominance
4 portion is most likely to tolerate a change in its value and not introduce thereby a visible
5 artifact; and

6 choosing as said selected chrominance portion the chrominance portion that was
7 determined in said making step for the most pixels of said block.

1 42. (original) The invention as defined in claim 41 wherein said determination in
2 said making step is made for at least one pixel of said block as a function of a prestored
3 table in computer readable form that indicates for each area within at least a colorspace
4 portion which chrominance portion should be selected for pixels within said each area.

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1 43. (original) The invention as defined in claim 41 wherein said determination in
2 said making step is made for at least one pixel of said block as a function of a calculation
3 that indicates which chrominance portion should be selected for a pixel as a function of
4 values of said pixel.

1 44. (original) The invention as defined in claim 38 further comprising the step of
2 deinterleaving said watermark data after it is extracted.

1 45. (original) The invention as defined in claim 44 further comprising the step of
2 channel decoding said deinterleaved extracted watermark data.

1 46. (original) The invention as defined in claim 38 further comprising the step of
2 channel decoding said extracted watermark data.

1 47. (original) The invention as defined in claim 38 further comprising the step of
2 computing said average of the values of said chrominance portion of the pixels of said at
3 least one block of said at least one frame from the values of said chrominance portion of
4 said pixels of said at least one block of said at least one frame.

1 48. (original) The invention as defined in claim 38 wherein said block of said
2 video signal is in a reduced resolution format such that for each 2x2 luminance block of
3 an original version of said video signal, had said original version of said video signal
4 been in 4-4-4 representation, there remains only one Y, one U, and one V value.

1 49. (original) The invention as defined in claim 48 further comprising the step of
2 decimating an original video signal to produce said watermarked video signal with a
3 reduced resolution format such that for each 2x2 luminance block of said original video
4 signal, had said original video signal been in 4-4-4 representation, there remains only one
5 Y, one U, and one V value.

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1 50. (original) A receiver for use in extracting watermark data from a
2 watermarked video signal, wherein said watermark data is carried in at least one bit
3 position of an average of the values of a chrominance portion of the pixels of at least one
4 block of at least one frame, said receiver comprising:

5 a color selector for indicating which chrominance portion is likely to be carrying
6 said watermark data in said average of said values of said chrominance portion for said
7 block;

8 a block integrator for computing said average of said values of said chrominance
9 portion for said block; and

10 a bit selector that supplies as an output said watermark data from said average of
11 said values of said selected chrominance portion.

1 51. (original) The invention as defined in claim 50 further comprising a block
2 variance calculator that determines, based on at least one texture variance of said block,
3 which bit position of said average of said values of said selected chrominance portion
4 should be supplied as said watermark data by said bit selector.

1 52. (original) The invention as defined in claim 51 a decimator that produces said
2 watermarked video signal from an original video signal such that for each 2x2 luminance
3 block of said original video signal, had said original video signal been in 4-4-4
4 representation, there remains only one Y, one U, and one V value in said watermarked
5 video signal.

1 53. (original) A processor for embedding additional watermarking data within a
2 video signal, said processor being operative:

3 to select a chrominance portion of a block of said video signal to carry a portion
4 of said additional watermarking data; and

5 to cause a change in the average value of said selected chrominance portion so as
6 to incorporate at least a portion of said additional watermarking data within said changed
7 average value.

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1 54. (original) Software in computer executable format for embedding additional
2 watermarking data within a video signal, said software comprising:

3 a module to select a chrominance portion of a block of said video signal to carry a
4 portion of said additional watermarking data; and

5 a module to a change in the average value of said selected chrominance portion so
6 as to incorporate at least a portion of said additional watermarking data within said
7 changed average value.

1 55. (original) Apparatus for use in extracting watermark data from a watermarked
2 video signal, wherein said watermark data is carried in at least one bit position of an
3 average of the values of a chrominance portion of the pixels of at least one block of at
4 least one frame, said apparatus comprising:

5 means for selecting a chrominance portion is likely to be carrying said watermark
6 data in said average of said values of said chrominance portion for said block; and

7 means for extracting said watermark data from said average of said values of said
8 selected chrominance portion.

1 56. (original) A method for use in extracting watermark data from a watermarked
2 video signal, wherein said watermark data is carried in at least one bit position of an
3 average of the values of a chrominance portion of the pixels of at least one block of at
4 least one frame, said method comprising the steps of:

5 selecting a chrominance portion is likely to be carrying said watermark data in
6 said average of said values of said chrominance portion for said block; and

7 extracting said watermark data from said average of said values of said selected
8 chrominance portion.

1 57. (currently amended) Apparatus for embedding watermarking data within a
2 video signal, comprising:

3 means for receiving a video signal in a frequency domain based format; and

4 means for changing a DC coefficient of at least one block of said video signal to
5 carry at least a portion of said watermarking data.

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1 58. (new) A system for embedding watermarking data within a video signal at a
2 transmitter and recovering said watermarking data at a receiver, wherein:
3 said transmitter comprises:
4 a color selection unit for selecting a chrominance portion of a block of said video
5 signal to carry a portion of said additional watermarking data; and
6 a data adder that adds information to pixels of said block of said video signal
7 thereby causing a change in the average value of said selected chrominance portion so as
8 to incorporate at least a portion of said additional watermarking data within said changed
9 average value; and
10 said receiver comprises:
11 a color selector for indicating which chrominance portion of said video signal
12 incorporating at least a portion of said additional watermarking data is likely to be
13 carrying said watermark data in said average of said values of said chrominance portion
14 for received block;
15 a block integrator for computing said average of said values of said chrominance
16 portion for said received block; and
17 a bit selector that supplies as an output said watermark data from said average of
18 said values of said selected chrominance portion;
19 wherein at least one of said color selection unit and said color selector comprises a
20 prestored table in computer readable form that indicates for each area within at least a
21 colorspace portion which chrominance portion should be selected for pixels within said
22 each area.